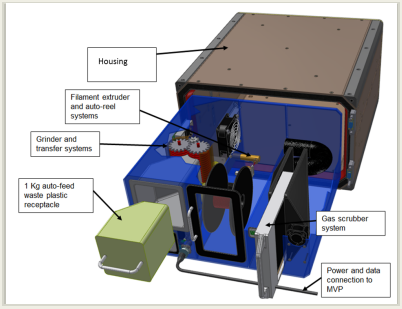
Space Plastic Recycling System, Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

Techshot's proposed Space Plastic Recycler (SPR) is an automated closed loop plastic recycling system that allows the automated conversion of disposable ISS packaging materials into suitable 3D printer filament. The SPR includes a receptacle to hold materials to be recycled, a grinding system to cut materials into small pieces, an auger system to transport the shredded material to a heated nozzle and a tension controller to precisely control the diameter of the filament produced. An automatic spooling system will wind the processed filament neatly onto a spool. The SPR includes a method to categorize and label spaceflight packaging materials making them easily identifiable as "print recyclables". The recycler will use the material label barcodes to automatically configure internal settings to process the material without the need for manual adjustments by the user. We propose operating and controlling the SPR inside the modular Techshot Multi-purpose Variable-G Platform (MVP). Now in Phase III development, MVP has been designed to house, control and provide environmental control for a wide variety of ISS experiments, including hardware such as the SPR. Operating the SPR inside the MVP offers several advantages, such as temperature and humidity control and the ability to monitor and capture vapors. The MVP also provides an extra layer of containment for noise and EMI. But the primary advantage of operating the SPR inside of the MVP is the reduction of development time and cost by eliminating the need to develop separate housing, control and data acquisition systems. The MVP already includes all of the power, data, control and mounting interfaces needed to operate the SPR. The SPR filtering system will ensure that gases and ultrafine particles are maintained below safe limits. The MVP software will monitor the system and shut it down, should any of the air quality measurements exceed safe limits.



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Small Business Innovation Research/Small Business Tech Transfer

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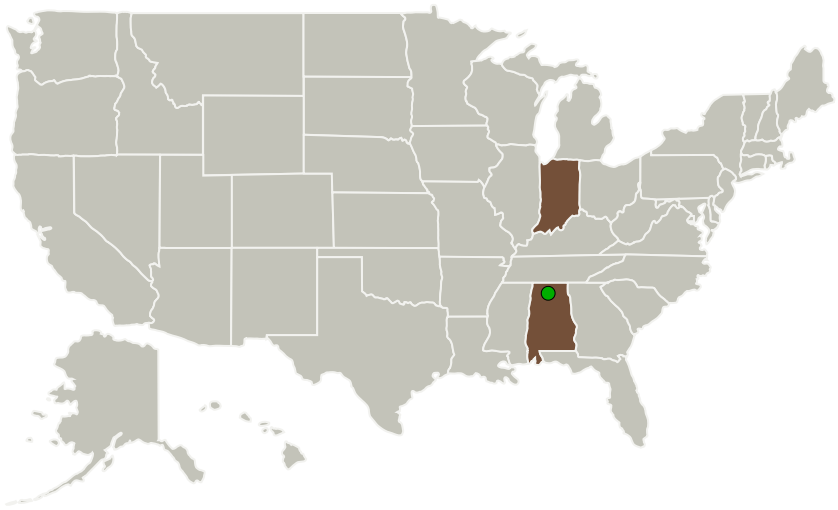
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Techshot, Inc.	Lead Organization	Industry	Greenville, Indiana
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Indiana

Project Transitions

June 2015: Project Start

December 2015: Closed out

Closeout Summary: Space Plastic Recycling System, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/139479)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Techshot, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

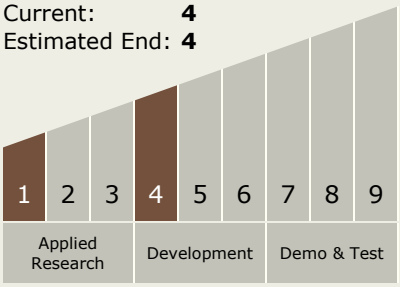
Carlos Torrez

Principal Investigator:

Leo Shulthise

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



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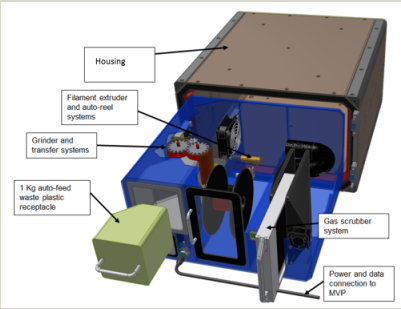
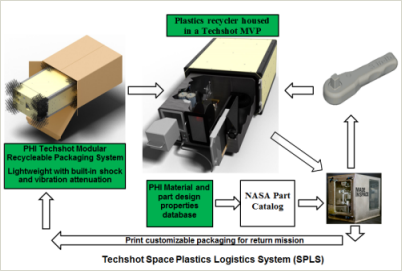
Images



Briefing Chart Image
Space Plastic Recycling System, Phase I
(https://techport.nasa.gov/image/132917)



Final Summary Chart Image
Space Plastic Recycling System, Phase I Project Image
(https://techport.nasa.gov/image/132734)

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.2 Mission Infrastructure, Sustainability, and Supportability
    - TX07.2.2 In-Situ Manufacturing, Maintenance, and Repair

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System